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Progress and Future Directions on Physical Activity Research Among Youth

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Introduction

There is strong evidence to support the benefits of regular physical activity for children and adolescents (heretofore referred to as “youth”). Evidence includes improved cardiorespiratory fitness, muscular fitness, bone health, body composition, and cardiovascular and metabolic health biomarkers.^{1–3} Importantly, physical inactivity is a modifiable risk factor for lifestyle-related chronic diseases and conditions⁴ and may track through adulthood.⁵ Because of the potential benefits and modifiable nature of the behavior, the “2008 Physical Activity Guidelines for Americans”² recommends one hour or more of daily physical activity for youth. Most of the time should be spent in either moderate- or vigorous-intensity aerobic activities and should also include muscle and bone strengthening activities. The 2010 World Health Organization “Global Recommendations for Physical Activity and Health”³ supports similar guidelines for youth.

Across the socioecologic framework,^{6, 7} previous research consistently identifies multiple factors that influence youth physical activity behaviors.^{8–10} They include intrapersonal factors such as enjoyment of physical activity, interpersonal factors such as social support, cultural factors such as acculturation, environmental factors such as availability of parks and recreational centers, and policy factors such as whether public schools require physical education and recess. Also, a literature is rapidly developing around sedentary behaviors as a distinct and separate outcome from physical activity,¹¹ with its own set of correlates and determinants.^{10, 12}

This special issue highlights research on the determinants and outcomes of physical activity among youth. In this editorial, we provide some recommendations for future study design and highlight select studies in this special issue. We focus attention on physical activity, but many of these recommendations could also be considered when studying sedentary behaviors.

Longitudinal Study Designs

Cross-sectional study designs are often used in epidemiologic research and can help identify correlates of physical activity. Longitudinal studies, both observational and interventional, help move researchers closer to understanding determinants and mediators of physical activity.¹³ An advantage of prospective longitudinal designs is that they can address reverse causality. In this issue, several studies utilize longitudinal designs to address their research questions.^{14–17} These designs will help provide a stronger evidence base and direction for future public health guidelines around youth physical activity.

Attention to Generalizability and Diversity

Describing the generalizability of a study is important, as it helps others understand for whom the study is applicable or generalizable. It is important to conduct studies among diverse populations, considering inclusion of countries worldwide, geographic regions (i.e., rural and urban), and of the underserved. For example, in this supplement, Newton et al¹⁸ studied rural youth and Lawman et al¹⁹ focused on underserved adolescents.

Integration of Behavioral Theories

A theory can present a systematic way of understanding situations or events, by providing a set of concepts, definitions, and propositions that help explain or predict situations or events.²⁰ The integration of behavioral theories and concepts into youth physical activity research can provide a road map for studying a problem, developing appropriate interventions, and evaluating successes and failures. Important to this work is the identification of mediators and moderators of change in physical activity. Also critical to this work is the continued importance of theory development as it applies to physical activity behaviors. For example, in this supplement, Hsu et al²¹ incorporates measures from the Health Belief Model and the Theory of Meanings of Behavior to address questions regarding perceived barriers and negative meanings of physical activity among middle-schoolers. Another example in this supplement, written by Lawman et al,¹⁹ uses Self-Determination Theory and Social Cognitive Theory to understand how psychosocial factors relate to youth physical activity.

Measurement of Physical Activity

Once limited to self-report or direct observation, measurement of physical activity continues to evolve, taking advantage of advances in technology. Objective measurement of physical activity has improved over time with emerging technologies that provide greater precision. Despite this evolution, more work must be done to more accurately quantify physical activity, the movement associated with the activity, and the associated metabolic costs. In this issue, an approach to analyzing accelerometer data is explored.²² With regards to pedometry, in this supplement Vincent Graser et al²³ explores individual differences associated with steps recorded from a pedometer, and Brusseau et al²⁴ explores variation in step counts among elementary age children throughout the school day.

Improved Specificity

Specificity in the measurement of both exposures and outcomes should be considered when developing a research study. Others have shown improved predictive capacity of models when measures more closely match the behavior of interest (i.e., some type of physical activity) and the settings in which the behavior occurs.²⁵

Clarification of Dose Response

In studies of physical activity outcomes, it is important for researchers to explore dose response relationships. For example, dose response can be explored when physical activity is the exposure and associations with proximal (during childhood or adolescence) or distal (into adulthood) health outcomes are explored. Dose response most simply means that for a change in an exposure, there is a concomitant change in the prevalence or risk of the outcome. Understanding the shape of the dose response curve can contribute to more precise and robust public health recommendations for physical activity among youth.¹

Surveillance

Ongoing, systematic, timely surveillance continues to be critically important to our understanding of patterns and trends in youth physical activity. Alarming, there are few data in the world that provide a clear understanding of prevalence and trends in youth physical activity. Even less is known about negative risks of physical activity among children and adolescents. In this issue, Yard et al²⁶ attempt to address this dearth of data by using injury surveillance data to explore injury patterns of high school youth. Another use of surveillance data comes from the Mark et al²⁷ study, that used the National Health and Nutrition Examination Survey data to explore the association of physical activity with adiposity.

Foster Reviews and Meta Analyses

Researchers are encouraged to make available the measurement instruments they used to foster cross-study collaboration. The description of data collection, data processing, and reporting of key measures is also important. In some cases, resources and documentation can be posted online and linked to published papers. These steps will aid in the summarizing of topics within the field of youth physical activity research, by comparing studies with similar measures.

Summary

Physical activity provides important health benefits for young people. The dose and type of physical activity required to produce health benefits vary across outcomes.¹ The science to support future work, and to further enhance physical activity guidelines,^{2, 3} would be strengthened by integrating longitudinal study designs, considering the generalizability and diversity of the populations and contexts under study, exploring dose response relationships, integrating theory into studies, and fostering surveillance. Additionally, methodological developments around both objective and self-reported measures will continue to need improvement, as well as focusing on improving specificity of study exposures and outcomes. The ultimate goal is to improve physical activity behavior adoption and maintenance among youth for a lifetime.

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